IQS62x PIR Nano Shield Quick Start Guide

Multifunctional Pyroelectric Infrared Radial (PIR) sensor with capacitive proximity/touch, ambient light measurements and hall-effect capabilities

The IQS62x ProxFusion® IC's can be configured as a multifunctional Pyroelectric Infrared Radial (PIR) sensor. This configuration can be used for applications such as energy efficient occupancy detection applications by means of movement detection. Other features of the ProxFusion® IC's include capacitive prox/touch sensing, inductive sensing, ambient light measurements and hall-effect sensors. These features can be combined with the PIR sensors for energy efficient lighting and room occupation applications.

Kit Overview

- PIR sensing (Movement sensing)
- Capacitive sensing
- Inductive sensing
- Sample coil/touch pad supplied
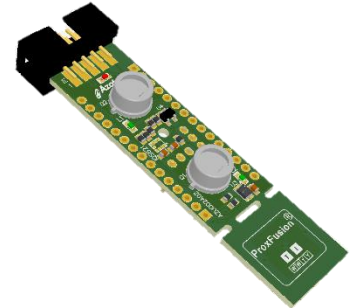- Ambient Light Sensing (ALS)
- Hall-effect Sensing

Figure 1: IQS62x PIR Nano Shield Orthogonal view

Evaluation Modes

- Connect IQS62x PIR Nano Shield via a CT210A USB Dongle[1] to PC GUI
  - Raw information displayed in GUI
- Assemble the module into a mock-up application and test
  - Sample PIR's and lenses supplied
  - Sample inductive coil/touch pad supplied
- Plug into Arduino Nano[1] or ST Nucleo[1]
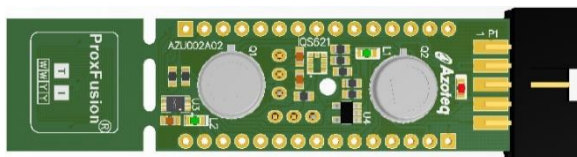 - Develop firmware for custom applications
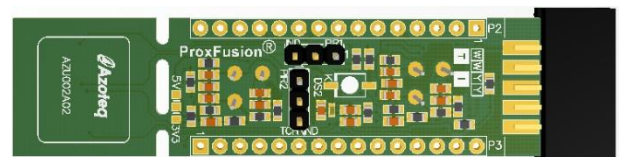
Figure 2: IQS62x PIR Nano Shield Top view

Figure 3: IQS62x PIR Nano Shield Bottom view

Applications

- Standard PIR sensor cost reduction
- Battery powered PIR solutions
- Smart Home Systems
- Alarm Systems

- Room occupancy detection
- White goods and appliances
- Human Interface Devices
- Movement activated backlighting

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[1]Sold Separately

IQS62x PIR Nano Shield IC's

There are two IC versions of the IQS62x PIR Nano Shield. The IQS621 are placed on the one version (A) and the IQS620A are placed on another version (B). IQS62x refers to the IC version on the board throughout the document. It should be noted that RF immunity can further be optimised with PCB layout. The PIR Nano shield was designed to be user friendly and not RF immune. Refer to the IQS62x PIR application note (AZD104) for more information on RF immunity.

Multi-sensor solutions

- Connect IQS62x PIR Nano Shield via a CT210A USB Dongle[1] to IQS62x PC GUI.
- Place a lens over each PIR sensor.
- See Table 1 for different configurations:

Table 1: Multi-sensor configurations

Sensor Combination	PCB Version			Evaluation
	AZU002A02 IQS621	AZU002A03 IQS621	AZU002B01 IQS620A	
Dual PIR Sensing				Movement on CH0 & CH1
PIR and capacitive				Movement on CH0 and touch on CH1
Inductive				Metal Detect on CH1

- Position jumpers to the desired position.
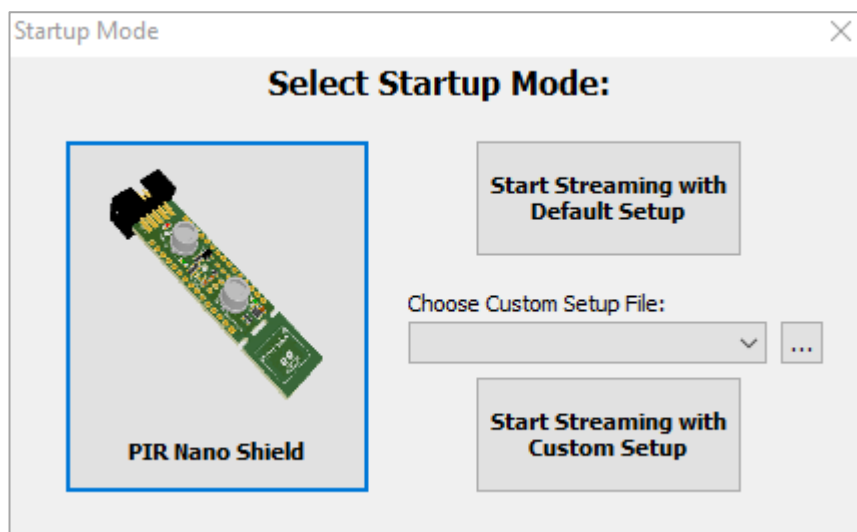- Click Start and select the PIR Nano Shield.

Figure 4: Select Startup Mode

- The GUI detects the configuration and the raw information is displayed on the GUI.
- To switch between configurations, click on Stop and Start the process again.

- With each configuration the ALS(IQS621), hall-effect sensing and temperature measurements are shown in the GUI.
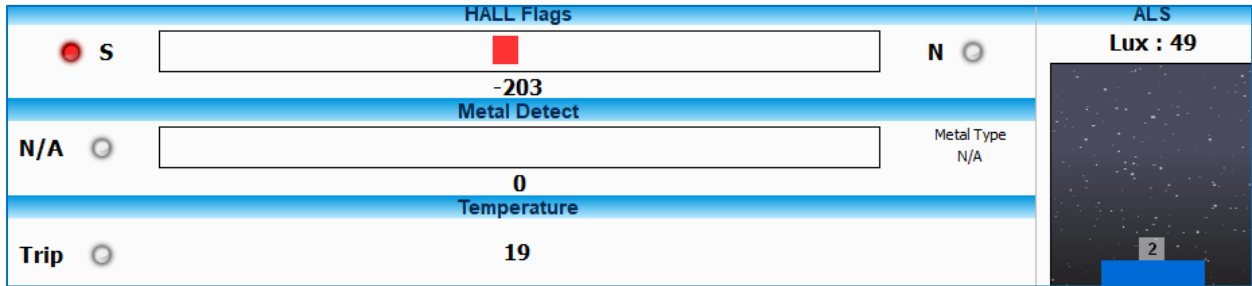

Figure 5: GUI Display

Different Fresnel Lenses

The field of view and range of the PIR application is dependent on the type of lens used. A wall switch Fresnel lens and a ceiling mount Fresnel lens are included with the package. These lenses can be swopped out for different applications.

Wall Switch   Ceiling Mount

Figure 6: Different Fresnel Lenses (www.fresneltech.com)

Refer to the IQS62x PIR application note (AZD104) for more information on lenses.

Temperature Monitoring

The ProxFusion sensor IC's (IQS620A & IQS621) provides temperature monitoring capabilities which can be used for temperature change detection to ensure the integrity of other sensing technology. The use of the temperature sensor is primarily to reseed other sensor channels to account for sudden changes in environmental conditions. These changes can be used to make intelligent decisions regarding PIR triggers and human occupancy detection. The temperature channel needs to be calibrated per device. Contact Azoteq for more information regarding temperature calibration.

If the IQS620A demo have a label on it has been calibrated manually. These values are displayed in the order below and can be written to the temperature registers.

Multipliers_Coarse.Multipliers_Fine.Temp_Divider.Temp_Multiplier.Temp_Offset

The example below shows the values written in the GUI. The label on the PCB was:
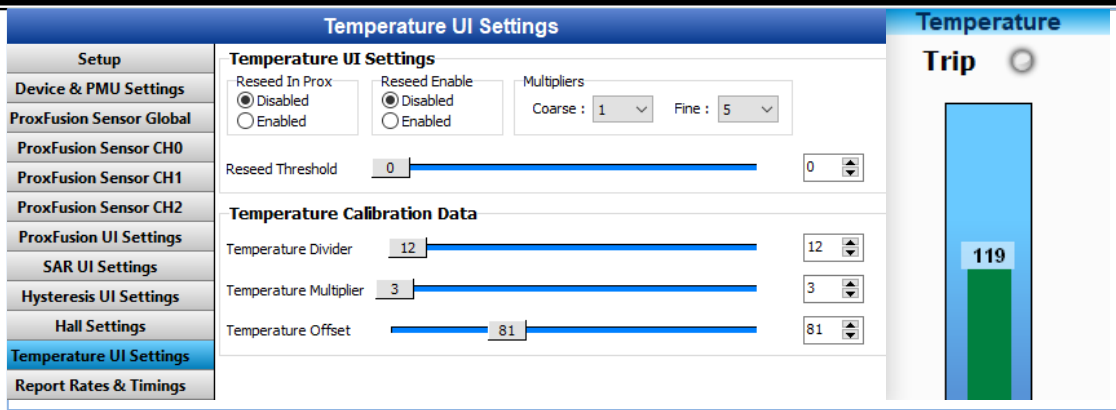
1.5.12.3.81

Figure 7: Temperature UI Settings

IQS62x Arduino Nano Shield

The IQS62x PIR Demo is also a shield for the Arduino Nano and ST Nucleo Nano. Custom firmware can be developed for either MCU to further evaluated the IQS62xPIR demo or to build a standalone demo. The demo board has two output LED's to display events. Table 2 gives a list of pins connected on the shield.

Table 2: IQS62x Nano Shield Connections

Component	Shield Connection	Nano Connection
LED (L1)	P2-6	D3
LED (L2)	P2-14	D11
IR LED	P2-13	D10
IQS621 SDA	P3-8/P2-2	A4/Rx0
IQS621 SCL	P3-9/P2-1	A5/Tx0
IQS621 RDY	P2-5	D2

In order to use the serial monitor in the Arduino IDE with AZU002A02, P2-1 and P2-2 should be disconnected from the Arduino. This can be done by either removing the shield pins or Arduino pins in AZU002A02. On AZU002A03 and AZU002B01 the pins are disconnected by default.